

IN THE CLAIMS

1. (Currently Amended) A solid-state image pickup device, comprising:

a pixel portion having unit pixels arranged two-dimensionally in a matrix form, each of said unit pixels including a photoelectrically transducing element for photoelectrically transducing incident light to obtain a signal charge, and stocking the signal charge thus obtained, a selection switch for selecting one of the pixels, and a read-out switch for reading out the signal charge from said photoelectrically transducing element to one of a plurality of vertical signal lines;

a plurality of amplifying means, at least one of the amplifying means being connected to each of said respective vertical signal lines and for converting the signal charge read out to the vertical signal lines to an electrical signal; and

a plurality of reset means for resetting each of said vertical signal lines;

wherein each of said selection switch and said read-out switch comprises a MOS transistor having a double gate structure, and

wherein each gate electrode of said selection switch and said read-out switch comprises a two-layer gate electrode, and neighboring portions are overlapped with each other, and

wherein the gate electrode of one of the selection switch and the read-out switch is connected to one of the vertical signal lines and the gate electrode of the other of the selection switch and the read-out switch is connected to one of a plurality of horizontal signal lines.

2. (Original) The solid-state image pickup device as claimed in claim 1, wherein said photoelectrically transducing element comprises a photodiode having a HAD sensor structure.

3. (Previously Presented) The solid-state image pickup device as claimed in claim 1, wherein each of said reset means resets the respective vertical signal line in synchronism with a read-out timing before one pixel is read or a horizontal scan timing begins.

4. (Original) The solid-state image pickup device as claimed in claim 1, wherein each of said reset means resets the vertical signal line just before the signal charge is read out from said photoelectrically transducing element.

5. (Original) The solid-state image pickup device as claimed in claim 1, wherein said selection switch and said read-out switch are connected to each other in series between said photoelectrically transducing element and said vertical signal line.

6. (Original) The solid-state image pickup device as claimed in claim 5, wherein said selection switch is disposed at said photoelectrically transducing element side.

7-8. (Canceled).

9. (Original) The solid-state image pickup device as claimed in claim 1, wherein said read-out switch is connected between said photoelectrically transducing element and said vertical signal line, and said selection switch is connected between a control electrode of said read-out switch and a read-out pulse line.

10. (Original) The solid-state image pickup device as claimed in claim 9, wherein said selection switch comprises a depression type MOS transistor.

11. (Previously Presented) The solid-state image pickup device as claimed in claim 1, wherein a horizontal selection switch for commonly outputting a reset level on said vertical signal line at a reset time of said reset means and a signal level read out onto said vertical signal line after the reset is provided between said vertical signal line and a horizontal signal line.

12. (Original) The solid-state image pickup device as claimed in claim 11, further including a differential circuit for calculating the difference between the reset level successively output by said horizontal selection switch and the signal level.

13. (Original) The solid-state image pickup device as claimed in claim 12, wherein said differential circuit comprises a correlation double sampling circuit.

14. (Currently Amended) A method of driving a solid-state image pickup device comprising a pixel portion having unit pixels arranged two-dimensionally in a matrix form, each of said unit pixels including a photoelectrically transducing element for photoelectrically transducing incident light to obtain a signal charge and stocking the signal charge thus obtained, a

selection switch for selecting one of the pixels, and a read-out switch for reading out the signal charge from said photoelectrically transducing element to one of a plurality of vertical signal lines; a plurality of amplifying means at least one of which are connected to each of said respective vertical signal lines and for converting the signal charge read out to the vertical signal lines to an electrical signal, and a plurality of reset means for resetting each of said vertical signal lines, the method comprising the steps of:

resetting the vertical signal line;

after resetting the vertical signal line, reading out a pixel signal from said photoelectrically transducing element to the vertical signal line to successively output a reset level and a signal level in this order through the same route; and

after reading out the pixel signal, calculating a difference between the reset level and the signal level, wherein each of said selection switch and said read-out switch comprises a MOS transistor having a double gate structure,

wherein each gate electrode of said selection switch and said read-out switch comprises a two-layer gate electrode, and neighboring portions are overlapped with each other, and

wherein the gate electrode of one of the selection switch and the read-out switch is connected to one of the vertical signal lines and the gate electrode of the other of the selection switch and the read-out switch is connected to one of a plurality of horizontal signal lines.

15. (Previously Presented) The solid-state image pickup device driving method as claimed in claim 14, wherein the solid-state image pickup device comprises a plurality of vertical selection lines, and wherein neighboring vertical selection lines are simultaneously driven two by two in turn, and signal charges of two pixels in a vertical direction are mixed with each other on the vertical signal line.

16. (Currently Amended) A camera comprising:

an optical system for focusing incident light from a subject onto a solid-state image pickup device;

a driving system for driving said solid-state image pickup device; and

a signal processing system for processing an output signal of said solid-state image pickup device, wherein said solid-state image pickup device comprises a pixel portion having unit pixels arranged two-dimensionally in a matrix form, each of said unit pixels including a photoelectrically transducing element for photoelectrically transducing incident light to obtain

signal charge, and stocking the signal charge thus obtained, a selection switch for selecting one of the pixels, and a read-out switch for reading out the signal charge from said photoelectrically transducing element to one of a plurality of vertical signal lines, a plurality of means, at least one of which are connected to each of said respective vertical signal lines and for converting the signal charge read out to the vertical signal lines to an electrical signal, and a plurality of reset means for resetting each of said vertical signal lines, and wherein said driving system drives said solid-state image pickup device so that one of the vertical signal lines is first reset and then a pixel signal is read out from said photoelectrically transducing element to the vertical signal line to successively output a reset level and a signal level in this order through the same route, and thereafter calculates a difference between the reset level and the signal level, and wherein each of said selection switch and said read-out switch comprises a MOS transistor having a double gate structure, and

wherein each gate electrode of said selection switch and said read-out switch comprises a two-layer gate electrode, and neighboring portions are overlapped with each other, and

wherein the gate electrode of one of the selection switch and the read-out switch is connected to one of the vertical signal lines and the gate electrode of the other of the selection switch and the read-out switch is connected to one of a plurality of horizontal signal lines.

17. (Previously Presented) The camera as claimed in claim 16, wherein the solid-state image pickup device comprises a plurality of vertical selection lines, and wherein neighboring vertical selection lines of said solid-state image pickup device are simultaneously driven two by two in turn, and signal charges of two pixels in a vertical direction are mixed with each other on the vertical signal line to perform an interlace-supporting feedback read-out operation.
